



Australian Bureau of Statistics

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REMOVING THE EFFECT OF SUPPLEMENTARY SURVEYS FROM SEASONALLY ADJUSTED ESTIMATES

INTRODUCTION

This Information note reproduces a statement of 4 November 2014 from the Australian Statistician on the Labour Force estimates. This note does not contain any new or additional information.

PURPOSE

This statement provides background information on issues identified in seasonally adjusted labour force estimates over the period July-September 2014, on the investigations undertaken to understand these issues and the proposed approach for the release of the October 2014 labour force estimates on 6 November 2014.

The key points are:

- The ABS took the unusual step of setting the seasonal factors for most labour force series to one for July, August and September 2014.
- A review of labour force estimates has identified changes in the seasonal patterns of most labour force series as a result of changes in the supplementary survey program from February 2014.
- Labour force series other than those for aggregate monthly hours worked will be seasonally adjusted using a new method that treats effects from supplementary surveys as “corrections” rather than as ongoing seasonal influences.
- The new method will be introduced into labour force seasonally adjusted series from December 2013 onwards in the October 2014 labour force release
 - prior to December 2013, the seasonal factors will be based on a concurrent analysis on the original (unadjusted) estimates up to and including September 2014
 - as a result, the seasonally adjusted estimates have changed slightly prior to December 2013 compared with those published in the September issue of Labour Force, Australia
 - these seasonally adjusted estimates will not change until the annual seasonal reanalysis is completed in early 2015
 - the seasonal factors for months from December 2013 will be reanalysed as each extra month is added to the series so revisions to the seasonally adjusted estimates from December 2013 will continue to occur monthly.
- The new method will be introduced into the full length of the seasonally adjusted labour force estimates from February 1978 after the annual seasonal reanalysis is completed in early 2015
 - some estimates in these earlier months will be revised but most estimates will

not be materially affected by this process.

BACKGROUND

The seasonally adjusted labour force series of employment and unemployment have been unstable in the past few months. In the August 2014 issue of Labour Force, Australia (cat. no. 6202.0), the ABS reported that it had investigated this instability but no systematic cause could be identified at that time. When the September 2014 labour force estimates were being processed, the instability in the seasonally adjusted estimates of persons employed and unemployed became more pronounced. The ABS concluded that the seasonal adjustment, which is based on past patterns of seasonal and other systematic variation, was not operating as expected for July, August and September 2014. Accordingly, it set the seasonal factors to one for the estimates for these months (other than for aggregate monthly hours worked) and announced a review to determine the appropriate treatment for the October 2014 and subsequent releases of Labour Force, Australia.

INVESTIGATIONS

Prior to releasing the August 2014 labour force data, the ABS investigated the estimates produced in both July and August. While the movements between June and July for the seasonally adjusted unemployment rate and participation rate were unusual they were not unprecedented in the series. The movements between July and August 2014 for the seasonally adjusted employment series, especially part-time employment, were very large but again were not unprecedented. However, if the seasonal factors based on the previously observed seasonal pattern had been applied to September, there would have been a large fall in employment, more than offsetting the large rise in August.

Short-term volatility of this magnitude is unlikely to reflect labour market reality, so the cumulative evidence from these three months showed that the previously-observed seasonal patterns for these months were not evident in 2014. The ABS decided an alternative treatment was required and, as an interim measure, set the seasonal factors to one for all variables other than aggregate monthly hours worked.

The ABS identified several possible reasons for seasonal patterns to have changed during 2014:

- changes in the timing and content of the supplementary survey program (run in conjunction with the Labour Force Survey),
- the introduction of web-forms, which can be used by survey respondents as an alternative to being interviewed by telephone or in person,
- the introduction of a new labour force questionnaire, and
- refinements to collection procedures.

The ABS has investigated the extent to which these issues may have influenced the seasonality of the labour force estimates of persons employed and unemployed. An effect that has proved to be significant is the change in the timing of the supplementary surveys that are run in conjunction with the labour force survey. In common with similar countries (e.g. Canada), responses to the main labour force survey are affected to some extent by the supplementary surveys. The effects vary, depending on the topics covered by the supplementary surveys and their length. For many years, most of these supplementary surveys were run in the same month each year. As a result, any effects on the original labour force estimates caused by having different supplementary surveys in different months have been largely removed from the seasonally adjusted estimates

by the seasonal adjustment process.

TREATMENT FOR THE OCTOBER 2014 RELEASE

In the time since the September 2014 labour force estimates were released, the ABS has systematically assessed the effects of each supplementary survey on the labour force estimates. Significant effects have been found for some supplementary surveys, with little or no measurable impact caused by others. As a result of this analysis, an approach has been developed to re-estimate the seasonality of the labour force data with specific adjustments made for the changed pattern of supplementary surveys. This approach will be adopted for the October 2014 labour force release and will result in revisions to the previously-estimated seasonally adjusted (and consequently the trend) results.

In practice, the new seasonal methods should be used to revise the seasonally adjusted estimates for every month in the labour force estimates (i.e. from February 1978 to October 2014). However, checking the consistency of every series from 1978 is not possible in the short time available (the seasonal adjustment process is based on adjusting at a detailed level and aggregating the component series to the totals for persons employed and unemployed) even though the impacts will be small for most months.

The most urgent need has been to resolve the problems in the last few months in the time series. Therefore, as an interim measure, the new approach has been used only from December 2013 to October 2014. In practice, the impact of this interim measure on the percentage changes in seasonally adjusted persons employed and unemployed between November and December 2013 is minimal.

The revised methodology will be applied in future months. In addition, work will continue on refining the methodology and verifying the changed seasonal factors for the full length of the monthly series. The ABS expects to revise all the seasonally adjusted data in conjunction with the annual seasonal reanalysis in early 2015.

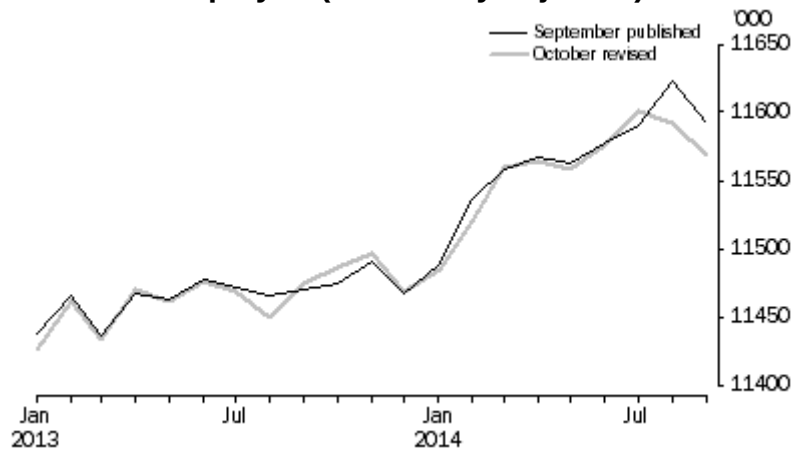
The Labour Force Survey uses the concurrent seasonal adjustment method to derive seasonal factors. Concurrent seasonal adjustment uses data up to the current month to estimate seasonal factors for the current and all previous months. This process can result in revisions each month to estimates for earlier periods. However, in most instances, the only noticeable revisions will be to the seasonally adjusted estimates for the previous month and one year prior to the current month. Concurrent seasonal adjustment will continue to be used during the next few months. However, as an interim measure, any revisions to seasonally adjusted estimates will be restricted to the period from December 2013 onwards until the annual seasonal reanalysis is completed in early 2015.

Setting the seasonal factors to one for the seasonally adjusted unemployment estimates for July, August and September 2014 published on 9 October resulted in a slight downward bias in the number of persons unemployed and the unemployment rate for those three months. This was not observed in other series and has been rectified by the new seasonal analysis.

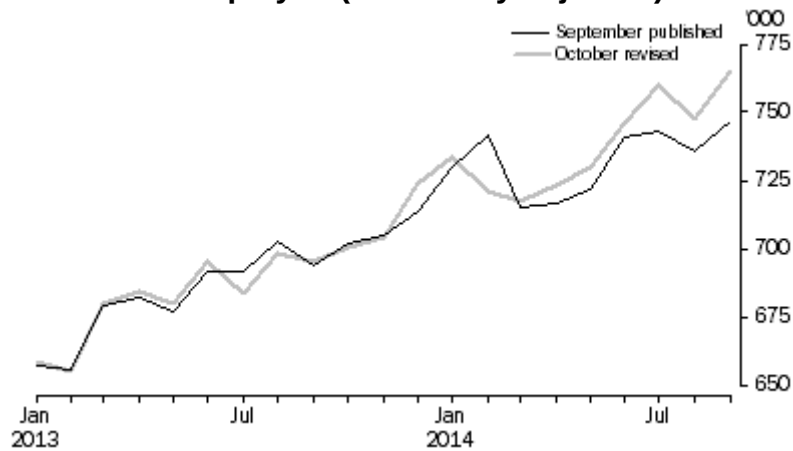
REVISIONS TO THE SEASONALLY ADJUSTED ESTIMATES

The following graphs show the seasonally adjusted estimates of persons employed and persons unemployed when the September 2014 issue of Labour Force, Australia (cat. no. 6202.0) was released and what they will be in the October 2014 issue, to be released on Thursday 6 November. The revisions to the unemployment rate in every month were either zero or 0.1 percentage points when using rounded data.

Employed (seasonally adjusted)



Unemployed (seasonally adjusted)



The following tables show the recent history of the key labour force series in seasonally adjusted terms and those to be published in the October 2014 issue of Labour Force, Australia.

TOTAL EMPLOYED (PERSONS) - SEASONALLY ADJUSTED

	Revised Level as at level	Level as at Sept 2014	Revised monthly percentage change (Mt/Mt-1)	Monthly percentage change as at Sept 2014 (Mt/Mt-1)	Revised year on year percentage change (Mt/Mt-12)	Year on year percentage change as at Sept 2014 (Mt/Mt-12)
	('000)	('000)	%	%	%	%
June 2013	11 476.6	11 478.0	0.1	0.1	1.2	1.2
July 2013	11 468.5	11 472.6	-0.1	0.0	1.1	1.1
August 2013	11 450.2	11 465.8	-0.2	-0.1	0.9	1.0
September 2013	11 475.4	11 470.6	0.2	0.0	0.8	0.8
October 2013	11 486.7	11 475.2	0.1	0.0	0.8	0.8
November 2013	11 497.1	11 491.3	0.1	0.1	0.9	0.9
December 2013	11 469.4	11 467.5	-0.2	-0.2	0.6	0.5
January 2014	11 484.6	11 488.1	0.1	0.2	0.5	0.4
February 2014	11 520.8	11 536.2	0.3	0.4	0.5	0.6

March 2014	11 560.3	11 558.2	0.3	0.2	1.1	1.1
April 2014	11 564.1	11 567.6	0.0	0.1	0.8	0.9
May 2014	11 558.7	11 561.9	0.0	0.0	0.8	0.9
June 2014	11 575.6	11 578.2	0.1	0.1	0.9	0.9
July 2014	11 600.8	11 590.1	0.2	0.1	1.2	1.0
August 2014	11 591.8	11 622.2	-0.1	0.3	1.2	1.4
September 2014	11 568.1	11 592.5	-0.2	-0.3	0.8	1.1

NOTE: Revised = To be used in the October 2014 publication. As at Sept 2014 = Presented in the September 2014 publication.

TOTAL UNEMPLOYED (PERSONS) - SEASONALLY ADJUSTED

	Revised level	Level as at Sept 2014	Revised monthly percentage change (Mt/Mt-1)	Monthly percentage change as at Sept 2014 (Mt/Mt-1)	Revised year on year percentage change (Mt/Mt-12)	Year on year percentage change as at Sept 2014 (Mt/Mt-12)
	('000)	('000)	%	%	%	%
June 2013	695.5	691.6	2.3	2.2	12.2	12.0
July 2013	684.1	691.9	-1.6	0.0	10.3	10.7
August 2013	698.2	703.1	2.1	1.6	14.7	14.9
September 2013	695.7	694.3	-0.4	-1.3	4.8	4.7
October 2013	700.8	701.6	0.7	1.1	8.7	8.7
November 2013	704.2	704.9	0.5	0.5	11.7	11.7
December 2013	724.0	713.7	2.8	1.2	11.1	9.6
January 2014	733.6	729.6	1.3	2.2	11.4	11.0
February 2014	721.2	741.8	-1.7	1.7	10.1	13.1
March 2014	717.3	715.3	-0.5	-3.6	5.5	5.3
April 2014	723.2	716.6	0.8	0.2	5.6	5.1
May 2014	730.0	721.5	0.9	0.7	7.3	6.6
June 2014	746.2	741.3	2.2	2.8	7.3	7.2
July 2014	759.8	743.0	1.8	0.2	11.1	7.4
August 2014	747.3	735.5	-1.6	-1.0	7.0	4.6
September 2014	765.0	746.6	2.4	1.5	10.0	7.5

NOTE: Revised = To be used in the October 2014 publication. As at Sept 2014 = Presented in the September 2014 publication.

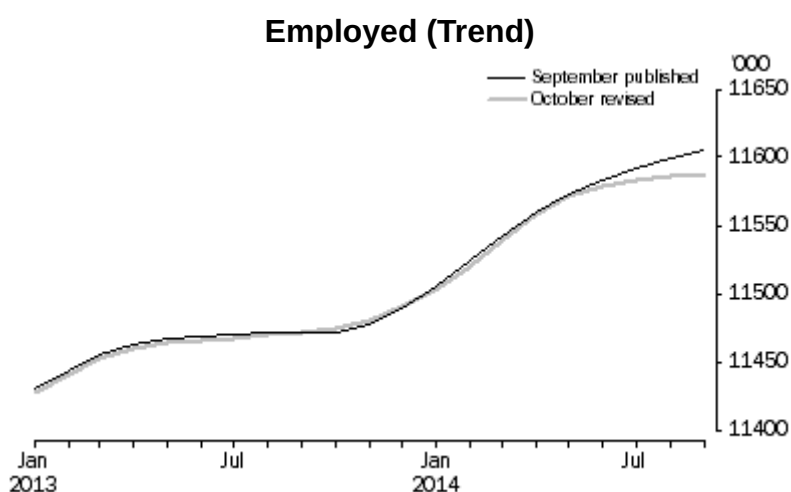
UNEMPLOYMENT RATE (TOTAL PERSONS) - SEASONALLY ADJUSTED

	Revised %	As at Sept 2014 %
June 2013	5.7	5.7
July 2013	5.6	5.7

August 2013	5.7	5.8
September 2013	5.7	5.7
October 2013	5.7	5.8
November 2013	5.8	5.8
December 2013	5.9	5.9
January 2014	6.0	6.0
February 2014	5.9	6.0
March 2014	5.8	5.8
April 2014	5.9	5.8
May 2014	5.9	5.9
June 2014	6.1	6.0
July 2014	6.1	6.0
August 2014	6.1	6.0
September 2014	6.2	6.1

THE EFFECTS ON TREND ESTIMATES

Revisions to seasonally adjusted estimates flow through to the trend estimates. However, as the following graphs show, the revisions to the trends of persons employed and persons unemployed were much smaller than those for the seasonally adjusted estimates. The revisions to the unemployment rate were mainly in the last three months in the series.



CONCLUSION

The ABS aims to minimise the impact of changes in the supplementary survey program on the key labour force estimates by continuing to monitor seasonal patterns and the performance of the new seasonal adjustment method. Users will be kept informed of any new developments by notes in Labour Force, Australia (cat. no. 6202.0).

ADDITIONAL INFORMATION

What does the new method mean for currently published data?

The seasonally adjusted estimate for the number of employed persons for September 2014 has been revised down by 24,400 persons. In terms of movements in employment, the biggest revision has been to the change in employment between July and August 2014, which has been revised from a growth of 32,100 persons to a fall of 9,000. The September 2014 movement has been revised from a fall of 29,700 to a fall of 23,700.

For the unemployment rate, the revised seasonally adjusted estimate for September 2014 is 6.2 percent, up 0.1 percentage points on the currently published data. The unemployment rates for June, July and August 2014 have all also been revised up by 0.1 percentage points.

The new method directly calculates and adjusts for the impact of supplementary surveys prior to the calculation of the "seasonal factors and is initially being introduced for the period December 2013 onward. However, in the October 2014 release there also will be revisions for earlier months' seasonally adjusted estimates. This is because the regular approach to measuring seasonality in the labour force can generate revisions in historical periods.

What are the future implications of the new method?

The ABS intends to use the new method for compiling seasonally adjusted labour force estimates for the October 2014 and subsequent labour force releases.

In the October 2014 release and for the following few months' releases, the new method will be used to compile seasonally adjusted estimates for the period December 2013 onward. When the ABS conducts its annual seasonal reanalysis in early 2015, the new method will be used to compile seasonally adjusted estimates for the full time series (i.e. back to February 1978). This will lead to revisions to historical estimates, which for the most part will be small. However, for some previous estimates the revisions may be significant.

It is not possible, because of timing constraints, to introduce the new method into the full time series from the October 2014 release.

The new method will ensure that changes in the supplementary survey program do not impact on seasonally adjusted estimates. However, there may still continue to be volatility in the labour force estimates, reflecting, among other things, 'world' changes and sampling variability.

Why was the new method introduced?

As previously advised by the ABS, recent seasonally adjusted estimates have been unusually volatile. This led to the ABS setting seasonal factors for July, August and September to one, pending a review of the issue. The review has subsequently identified that change to the program of supplementary surveys conducted as part of the monthly labour force survey was the significant contributing factor. The ABS has developed the new seasonal adjustment approach to take account of this impact.

Why has the ABS revised the seasonally adjusted labour force estimates for recent months?

Seasonally adjusted estimates are often revised as additional observations are received. The revisions made in the September 2014 issue of Labour Force, Australia (cat. no. 6202.0) and those in the October issue are more significant than usual reflecting a change in the historically observed patterns. The ABS revised the seasonally adjusted estimates for July and August 2014 in the September issue. The seasonally adjusted estimates (other than for aggregate monthly hours worked) for these two months and for September 2014 were made equal to the original (unadjusted) estimates because it had become apparent that the seasonal adjustment process was adversely affected by changes made to the Labour Force Survey and the associated supplementary survey program. The revisions in the October issue reflect a new seasonal adjustment method. If the ABS had not revised the July and August months in the September issue, the revisions made to the seasonally adjusted estimates for recent months in the October issue would have been considerably larger.

How far back have the seasonally adjusted estimates been revised?

The new seasonal adjustment method should be used to revise the seasonally adjusted estimates for every month in the labour force estimates (i.e. from February 1978 to October 2014). However, checking the consistency of every series from 1978 is not possible in the short time available prior to the release of the October 2014 estimates. (The seasonal adjustment process is based on adjusting at a detailed level and aggregating the component series to the totals for persons employed and unemployed.) The most urgent need has been to resolve the data problems in the last few months in the time series. Therefore, as an interim measure, the revised seasonal patterns calculated using the new method have been used only from December 2013 to October 2014. In practice, the impact of this interim measure on the percentage changes in seasonally adjusted persons employed and unemployed between November and December 2013 is minimal.

Is revising seasonally adjusted estimates from December 2013 onwards consistent with concurrent seasonal analysis procedures?

The Labour Force Survey uses the concurrent seasonal adjustment method to derive seasonal factors. Concurrent seasonal adjustment uses data up to the current month to estimate seasonal factors for the current and all previous months. This process can result in revisions each month to estimates for earlier periods. In most instances, the only noticeable revisions will be to the seasonally adjusted estimates for the previous month and one year prior to the current month. Concurrent seasonal adjustment will continue to be used during the next few months. However, as an interim measure, any revisions to seasonally adjusted estimates after the October 2014 issue will be restricted to the period from December 2013 onwards until the annual seasonal reanalysis is completed in early 2015.

How will future months be treated?

Work will continue on refining the new method and verifying the changed seasonal factors for the full length of the monthly series. The ABS expects to revise all the seasonally adjusted data in conjunction with the annual seasonal reanalysis in early 2015. For the next few months, the seasonal adjustment will be based on the same method that has been applied to the labour force data from December 2013 to October 2014.

What has caused the change in seasonal patterns in recent months?

The ABS has identified several possible reasons for seasonal patterns to have changed during 2014:

- changes in the timing and content of the supplementary survey program (run in conjunction with the Labour Force Survey),
- the introduction of web-forms, which can be used by survey respondents as an alternative to being interviewed by telephone or in person,
- the introduction of a new labour force questionnaire, and
- refinements to collection procedures.

The new seasonal adjustment method accounts for the first reason listed above and, although investigations are continuing, the ABS has no evidence that the other changes had a material impact on the estimates.

Why did the ABS implement changes to the Labour Force program?

In late 2010, the ABS commenced a review of its labour household surveys program to improve the relevance of data released, maximise the coherence of interrelated topics, minimise the duplication of content and ensure the collection remained cost effective. A holistic review was needed to ensure ABS labour statistics continue to reflect international standards and deliver high quality, coherent, conceptually robust and relevant statistics into the future. Implementing any change to a series like the labour force has some risks but change is needed to ensure that the series remains relevant

Why didn't the ABS determine the effects that each of these changes would have on the estimates?

Although the ABS assessed the potential impact of the changes to the labour force series prior to implementing them, the full significance of the changes was underestimated.

Why didn't the ABS conduct a parallel run to measure the effects of the changes?

Conducting a parallel survey can be an effective way of measuring change introduced into a series provided that the effects of the changes are sufficiently large. Given the standard errors involved in the labour force series, it can be very difficult to discern the level of change, if any, from the noise in the estimates. The analysis undertaken indicated that the extent of change anticipated could not be measured by conducting a parallel run.

How has the ABS determined the changes to the seasonal adjustment methods were required?

Following the release of the September 2014 issue of Labour Force, Australia, the ABS established an independent review of the labour force estimates. The main focus of the review was to determine reasons for the instability in the seasonally adjusted estimates of persons employed and unemployed in recent months. One of the early findings of the review was that the changes to the supplementary survey program were likely to have changed the seasonality of the main labour force series (the seasonal adjustments are based on previously observed patterns of seasonal and other systematic variations each month). As a result, the ABS has introduced a new method used in estimating seasonality to take account of these changes.

Why has the supplementary survey program not affected the seasonal pattern of the labour force series in the past?

Responses to the main labour force survey are affected to some extent by the supplementary surveys. The effects vary, depending on the topics covered by the supplementary surveys and their length. For many years, most of these supplementary surveys were run in the same month each year with generally the same content. As a result, any effects on the original (unadjusted)

labour force estimates caused by having different supplementary surveys in different months have been largely removed from the seasonally adjusted estimates by the seasonal adjustment process. The change in the timing of the supplementary surveys has broken the consistency of these patterns.

How has the ABS measured the effects of the changes in the supplementary survey program?

In the time since the September labour force estimates were released, the ABS has systematically assessed the effects of each supplementary survey on the labour force estimates. The method used regression techniques that are consistent with the seasonal adjustment process. Significant effects have been found for some supplementary surveys, with little or no measurable impact caused by others. The seasonality of the labour force data has been re-estimated with specific adjustments made for the changed pattern of supplementary surveys.

Why didn't the ABS introduce this new seasonal adjustment treatment earlier?

The ABS announced in the September 2014 issue of Labour Force, Australia (cat. no. 6202.0) that it had identified that previously-observed seasonal patterns were not apparent for recent months. However, the new method for measuring supplementary survey effects had not yet been investigated, developed and validated. As a result the ABS introduced an interim treatment that reduced the volatility in the seasonally adjusted series.

Why hasn't the aggregate monthly hours worked series been affected by the changes in the supplementary surveys program?

Standard seasonal adjustment was retained for the aggregate monthly hours worked series as the seasonality in this series is mainly driven by the effect of holidays and the usual seasonal patterns do not appear to have changed.

Why has the seasonally adjusted unemployment rate been revised upwards for recent months?

Setting the seasonal factors to one for the seasonally adjusted unemployment estimates for July, August and September 2014 published on 9 October resulted in a slight downward bias in the numbers of persons employed and the unemployment rate for those three months. This was not observed in other series and has been rectified by the new seasonal analysis.

What revisions were made to the seasonally adjusted estimates in the months to September 2014?

The tables and graphs shown in the first part of this note show the effects of the revised seasonal patterns.

Will the review of the labour force statistics result in further changes to the seasonally adjusted estimates?

No further changes to the estimates are expected as a result of the review. However, the seasonally adjusted labour force estimates will be revised from February 1978 onwards when the annual seasonal reanalysis is completed in early 2015 (see the question above "**How far back have the seasonally adjusted estimates been revised?**").

Have the trend estimates been revised?

The trend estimates were revised as a consequence of the revisions to the seasonally adjusted

series and the incorporation of estimates for October 2014. However, the revisions to the trend series for persons employed, persons unemployed and the unemployment rate were much smaller than those for the seasonally adjusted estimates.

When will the final outcomes of the Technical Review be released?

The final outcomes of the Technical Review will be released in the November 2014 issue of Labour Force, Australia (cat. no. 6202.0).

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